DOCUMENT RESUME

ED 451 961 PS 029 424

AUTHOR	Robertson, Robert E.
TITLE	Food Assistance: Research Provides Limited Information on the Effectiveness of Specific WIC Nutrition Services. Report to Congressional Committees.
INSTITUTION	General Accounting Office, Washington, DC.
REPORT NO	GAO-01-442
PUB DATE	2001-03-00
NOTE	30p.
AVAILABLE FROM	U.S. General Accounting Office, P.O. Box 37050, Washington, DC 20013. Tel: 202-512-6000; Tel: 202-512-2537 (TDD); Fax: 202-512-6061; e-mail: info@www.gao.gov; Web site: http://www.gao.gov.
PUB TYPE	Reports - Evaluative (142)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Breastfeeding; *Females; Low Income Groups; *Nutrition; Nutrition Instruction; *Preschool Children; *Program Effectiveness; Program Evaluation; Referral; Research Problems
IDENTIFIERS	Nutrition Services; *Women Infants Children Supplemental Food Program

ABSTRACT

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is a federally funded program providing supplemental food and nutrition services to lower-income pregnant, breastfeeding, and postpartum women and also serves infants and children up to age 5 who are at nutritional risk. Included in these services are nutrition education, breastfeeding promotion and support, and referrals to health and social services. As directed by the William F. Goodling Child Nutrition Reauthorization Act of 1998, this report: (1) identifies the number and nature of recent studies that have examined the effectiveness of nutrition education, breastfeeding promotion and support, and referral services; and (2) summarizes research information on the effectiveness of these services. Information was obtained through relevant databases and consultation with WIC program staff and other program stakeholders. Twelve demonstration and seven impact studies conducted after 1995 were examined. Most studies focused on breastfeeding promotion and support. Despite some methodological limitations, the findings of the demonstration studies suggest that certain types of interventions, such as providing breastfeeding support in the hospital following delivery, have the potential to be more effective than the usual WIC interventions. The more effective strategies may cost more than usual WIC approaches. The findings of the seven impact studies provided few insights into the effectiveness of specific services. Their findings were severely limited by methodological constraints, including the use of outdated and poor-quality data. This report concludes with a recommendation that the Department of Agriculture improve demonstration research by incorporating relevant cost information. Six appendices include information on the methodology, bibliographies of the demonstration and impact studies, and a table delineating major findings, scope, and limitations of the demonstration studies. (Contains 23 endnotes.) (KB)

Reproductions supplied by EDRS are the best that can be made
from the original document.

United States General Accounting Office

GAO

Report to Congressional Committees

March 2001

FOOD ASSISTANCE

Research Provides Limited Information on the Effectiveness of Specific WIC Nutrition Services

ED 451 961

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PS 029424

BEST COPY AVAILABLE

GAO

Accountability • Integrity • Reliability

GAO-01-442

Letter 3

Appendixes
Appendix I: Scope and Methodology 20
Appendix II: Research Funding Sources 22
Appendix III: Bibliography of Demonstration Studies 23
Appendix IV: Bibliography of Impact Studies 25
Appendix V: Demonstration Studies: Major Findings, Scope, and Major Limitations 26
Appendix VI: GAO Contacts and Staff Acknowledgments 28

Table
Table 1: Funding for Demonstration and Impact Studies 8

Abbreviations

FNS	Department of Agriculture's Food and Nutrition Service
WIC	Special Supplemental Nutrition Program for Woman, Infants and Children

GAO
Accountability • Integrity • Reliability

United States General Accounting Office
Washington, D.C. 20548

March 30, 2001

The Honorable Richard G. Lugar
Chairman
The Honorable Tom Harkin
Ranking Member
Committee on Agriculture, Nutrition, and Forestry
United States Senate

The Honorable John A. Boehner
Chairman
The Honorable George Miller
Ranking Democratic Member
Committee on Education and the Workforce
House of Representatives

The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) is a federally funded nutrition assistance program administered by the U.S. Department of Agriculture's (USDA) Food and Nutrition Service (FNS). This program provides supplemental food and nutrition services to lower-income pregnant, breastfeeding, and postpartum women. The program also serves infants and children up to age 5 who are at nutritional risk. The WIC program serves a monthly average of 7.3 million individuals, including about 47 percent of all infants born in the United States. In fiscal year 2000, the Congress appropriated $3.9 billion to fund WIC, $2.8 billion of which was used to provide food benefits and $1.1 billion of which was used for nutrition services and program administration. The nutrition services part of the program includes nutrition education, breastfeeding promotion and support, and referrals to health and social services.

A substantial body of research has examined the overall effectiveness of the WIC program, but little is known about what research shows regarding the effectiveness of specific WIC nutrition services. This report (1) identifies the number and nature of recent studies that have examined the effectiveness of three WIC services—nutrition education, breastfeeding promotion and support, and referral services—and (2) summarizes what the research shows about the effectiveness of these specific nutrition

services. This report is the fourth in a series providing information on various aspects of WIC nutrition services as directed by the William F. Goodling Child Nutrition Reauthorization Act of 1998 (P.L. 105-336).[1]

To identify recent studies that examine the effectiveness of each WIC nutrition service, we searched relevant databases, such as the National Technical Information Service, Sociological Abstracts, and Wilson Social Science Abstracts. We also consulted with USDA WIC program staff and other program stakeholders including officials from the National Association of WIC Directors. Initially, we identified more than 200 published WIC studies dealing with various aspects of the WIC program. In order to focus on recent research, we eliminated from consideration research published prior to 1995. We also eliminated any study that did not specifically address the effects of at least one of the three WIC nutrition services, whether nutrition education, breastfeeding promotion and support, or referral services. We included research that falls in two general categories: demonstration studies and impact studies. The demonstration studies typically attempt to assess whether special interventions, such as hospital visits to promote breastfeeding, more effectively achieve program objectives than the usual WIC services. In contrast, impact studies attempt to determine whether a WIC nutrition service, such as breastfeeding promotion and support, improves WIC participants' outcomes compared to similar individuals who do not participate in the WIC program.

We conducted our work between May 2000 and March 2001 in accordance with generally accepted government auditing standards. Appendix I provides a more detailed description of the methodology we used to conduct this work.

Results in Brief

We identified 19 studies published since 1995 that examine the effectiveness of WIC nutrition services. Twelve of the 19 are demonstration studies; seven are impact studies. Most of the studies—seven of the demonstration studies and four of the impact studies—focused on breastfeeding promotion and support.

[1] *Food Assistance: Financial Information on WIC Nutrition Services and Administrative Costs* (GAO/RCED-00-66, Mar. 6, 2000); *Food Assistance: Activities and Use of Nonprogram Resources at Six WIC Agencies* (GAO/RCED-00-202, Sept. 29, 2000); *Food Assistance: Performance Measures for Assessing Three WIC Services* (GAO/01-339, Feb. 28, 2001).

Despite some methodological limitations, the results of the 12 demonstration studies suggest that certain types of nutrition service interventions, such as providing breastfeeding support services in the hospital after delivery, have the potential to be more effective than theusual WIC interventions. Our analysis of the demonstration studies suggests that the more effective strategies may cost more than usual WIC approaches. However, only one of the studies specifically addressed the potential costs of new interventions. The results of the seven impact studies provide few, if any, insights into the effectiveness of specific WIC nutrition services. The results of the impact studies are severely limited by methodological constraints, including the use of outdated and poor-quality data.

We are making a recommendation to USDA aimed at improving demonstration research by incorporating relevant cost information. We provided a draft of this report to USDA for its review and comment. In commenting on the draft report, USDA generally agreed with the report and its recommendation. The agency provided some technical comments, which we incorporated as appropriate.

Background

WIC, which began as a 2-year pilot program in 1972 and was authorized as a permanent program in 1974, is part of the nutrition safety net available to low-income women and their children. FNS provides annual cash grants for food benefits and nutrition services to fund program operations at 88 state-level WIC agencies (including agencies in all 50 states, the District of Columbia, American Samoa, the Commonwealth of Puerto Rico, Guam, the U.S. Virgin Islands, and 33 Indian Tribal Organizations). Some of these state-level agencies—those that operate the program at both the state and local levels—retain all of their federal WIC grants. Most state-level agencies, however, retain a portion of their grants and pass the remaining funds to over 1,800 local WIC agencies.

In fiscal year 2000, about $2.8 billion in federal program funds were used to provide food benefits to participants. Typically food benefits are in the form of vouchers or checks that participants can use to obtain approved foods at authorized retail food stores. An additional $1.1 billion in federal funds were used for nutrition services and program administration. Program administration includes, among other things, activities related to accounting and record keeping, outreach, monitoring and financial audits, and general management. Nutrition services include activities related to determining participants' eligibility and issuing food benefits, as well as the following:

- Nutrition education: WIC offers classes, counseling, and other activities to teach participants about proper nutrition, positive food habits, and the prevention of nutrition-related problems.
- Breastfeeding promotion and support: To promote breastfeeding, WIC offers individual and group counseling sessions at WIC clinics or the hospital. Breastfeeding support can include telephone or in-person consultation with breastfeeding mothers.
- Referral to health care and social services: WIC agencies provide participants with information on health care and social services and refer them to providers including immunization clinics and the Food Stamp and Medicaid programs.

By law, spending for nutrition education and breastfeeding promotion and support activities combined must equal at least one-sixth of a state's total annual expenditures for nutrition services and administration plus a target amount for breastfeeding promotion and support that is established by FNS at the beginning of each fiscal year.[2] There is no minimum spending requirement for referral activities.

Over the past 20 years, government agencies such as USDA,[3] the Centers for Disease Control and Prevention, and GAO,[4] as well as universities and private research organizations, have conducted a substantial body of research on the effects of the entire WIC program. Some of the accumulated body of WIC research and evaluations provides nationwide assessments of WIC's effects. Most of it has focused on the effect of program participation on birth outcomes and the nutritional status of program participants. USDA has a review under way describing and assessing research on the diet and health outcomes of its nutrition programs, including WIC. The results of this review, set for release later

[2]In fiscal year 2000, the state agencies' targets for breastfeeding promotion and support were determined by multiplying $23.92 by the average number of pregnant and breastfeeding participants during the last 3 months for which there were final data (May-June 1999).

[3]In 1998, the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 1998 (P.L. 105-86) effectively transferred primary responsibility for research funding on food assistance and nutrition programs—including WIC—from FNS to USDA's Economic Research Service. Previously, USDA had spent about $3.5 million annually on such research.

[4]*Breastfeeding: WIC's Efforts to Promote Breastfeeding Have Increased* (GAO/HRD-94-13, Dec. 6, 1993); *Early Intervention: Federal Investments Like WIC Can Produce* (GAO/HRD-92-18, Apr. 7, 1992)

this year, will provide detailed information on over 70 studies, most of which examine WIC's effects on birth outcomes or on the nutrition status of participants. While the USDA review will not focus on the impacts of specific nutrition services, it will include studies that examined the WIC program's effects on the initiation and duration of breastfeeding and the immunization status of children. These two health-related outcomes are directly linked to two of the three nutrition services addressed in this report—breastfeeding promotion and support and referral services. However, because the USDA review is generally focused on overall program impacts, its report probably will not include descriptions or assessments of many of the demonstration studies included in this report.

Most of the Recent Research Evaluates Demonstrations of Special Interventions

The 19 studies we identified included almost twice as many demonstration studies as impact studies. Of the 12 demonstration studies, 3 look at special interventions in nutrition education, 6 look at special interventions in breastfeeding promotion and support, and 3 look at special interventions in referral to health and social services. Of the seven impact studies, one examines nutrition education, four assess breastfeeding promotion and support services, and two evaluate WIC health referrals.[5]

Most of the studies have a relatively limited geographic scope. Among the 12 demonstration studies, 11 are at the substate level. They generally study multiple WIC sites and/or multiple counties, but without sufficient sampling rigor to draw valid statewide conclusions. The results of one demonstration study are generalized to an entire state. Among the seven impact studies, three are at the substate level, one is statewide, and three are national in scope.

The 19 studies received funding from various sources. Table 1 provides details on project funding for the 12 demonstration studies and 7 impact studies.

[5]One impact study—Fox and others—is primarily a nutrition education evaluation, so we count it as such. However, it also contains information on WIC breastfeeding programs and their effects on initiation and duration.

Table 1: Funding for Demonstration and Impact Studies

Source of funding	Number of demonstration studies funded[a]	Number of impact studies funded[a]
USDA	1	2
U.S. Department of Health and Human Services	1	0
Centers for Disease Control and Prevention	5	0
State departments of health	4	1
Universities and research institutes	1	2
Private organizations	1	1
Unspecified	1	3

[a]These columns do not sum to 12 and 7, respectively, because some studies received funding from multiple sources.

Appendix II provides detailed information on the funding sources for the 19 studies reviewed for this report.

Special Interventions Improve Participant Outcomes but Research Says Little About the Effectiveness of Individual Nutrition Services

While all 19 studies suffer from methodological limitations, those limitations have varying consequences. Despite their limitations, the results of the 12 demonstration studies suggest that special interventions have some potential to improve nutrition service effectiveness over WIC interventions typically used; though, based on our analysis of these studies, it appears that additional resources may have to be committed to achieve this added effectiveness. However, the methodological limitations of the seven impact studies enable them to provide only very limited information on the effects of any one nutrition service. Appendixes III and IV contain lists of the demonstration and impact studies, respectively, reviewed for this report.

Demonstration Studies Indicate Some Special Interventions Improve Participant Outcomes

The 12 demonstration studies evaluate a range of different special interventions. To varying degrees, all were more effective than usual WIC interventions. Examples of the special interventions include the following:

- Breastfeeding promotion and support. Gross and others evaluated special interventions designed to encourage breastfeeding among African-American WIC participants.[6] Mothers in the three special

intervention groups were provided a motivational video or peer counseling or a combination of the video and counseling. Mothers in the control group received the standard WIC service that incorporated encouragement and support to breastfeed and brochures about breastfeeding during discussions about infant feeding. Mothers in the special intervention groups were twice as likely as mothers receiving the standard WIC infant feeding education to be breastfeeding 8 weeks and 16 weeks after giving birth, even accounting for factors that could increase breastfeeding duration, such as prior breastfeeding experience.

- Health referrals. Birkhead and others evaluated two special interventions designed to increase the number of WIC-eligible children who receive measles immunizations.[7] The special interventions included having WIC staff escort children to an on-site immunization clinic and a food voucher incentive in which WIC staff provided only a 1-month supply of vouchers to parents, rather than the usual 2-month supply, until the parents provided documentation that their children's immunizations were up-to-date. The standard WIC immunization referral consisted of notifying parents that immunizations were due, providing information on the benefits of immunizations, and providing the names and telephone numbers of local health facilities that immunize children. Children at escort sites were about five times more likely to be immunized than children at standard referral sites; children at voucher incentive sites were about three times more likely to receive immunizations.
- Nutrition education. Havas and others evaluated a special intervention designed to increase WIC participants' consumption of fruits and vegetables.[8] The special intervention—Maryland's "5-A-Day" program—was a series of three 45-minute group sessions taught by former WIC participants, or "peer educators," that incorporated special visual materials and included direct mailings to participants. The standard

[6]Susan M. Gross, Laura E. Caulfield, Margaret E. Bentley, and others, "Counseling and Motivational Videotapes Increase Duration of Breastfeeding in African-American WIC Participants Who Initiate Breastfeeding," *Journal of the American Dietetic Association*, Vol. 98, No. 2 (1998), p. 143.

[7]Guthrie S. Birkhead, Charles W. LeBaron, Patricia Parsons, and others, "The Immunization of Children Enrolled in the Special Supplemental Food Program for Women, Infants, and Children (WIC)," *Journal of the American Medical Association*, Vol. 274, No. 4 (1995), p. 312.

[8]Steven Havas, Jean Anliker, Dorothy Damron, and others, "Final Results of the Maryland WIC 5-A-Day Promotion Program," *American Journal of Public Health*, Vol. 88, No. 8 (1998), p. 1161.

service generally included less than 10 minutes of nutrition education conversation between WIC staff and participants when they picked up their food voucher every other month. Compared to participants receiving the standard WIC nutrition education program, participants exposed to the special intervention displayed a significant increase in nutrition knowledge and in the consumption of fruits and vegetables.

Each of the demonstration studies we reviewed suffers from methodological limitations that, while not invalidating the study's findings, should be taken into account. The limitations we identified are common in studies that attempt to assess the extent to which social or health program interventions—not other factors—are responsible for changes in program participants' behaviors or health. The major methodological limitations of the demonstration studies we reviewed include the following:

- Lack of control group. To help isolate the effects of an intervention, an evaluation study must compare people receiving the special intervention to similar people receiving standard WIC services. The difference between these groups can provide insight into whether the special intervention is more effective than standard WIC practice. Not having such a comparison obscures the relationship between the intervention and participant outcomes. Four of the studies we reviewed had a weak research design associated with a lack of control group. For example, Hoekstra and others attempted to evaluate the effectiveness of a new voucher incentive program in increasing WIC children's rates of immunization.[9] However, the researchers did not compare the group receiving the special intervention to a group receiving standard services. Instead, they compared three special intervention groups to themselves at different points in time over a period of 14 months. Without a control group that does not participate in the voucher intervention, it is difficult to attribute any changes the researchers noticed to the special intervention.
- Inappropriate data analysis techniques. The analytic techniques used in a study must suit the available data and the research design—in particular, they should be selected for their ability to help isolate the effects of the intervention. Three of the demonstration studies we

[9]Edward J. Hoekstra, Charles W. LeBaron, Yannis Megaloeconomou, and others, "Impact of a Large-Scale Immunization Initiative in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)," *Journal of the American Medical Association*, Vol. 280, No. 13 (1998), p. 1143.

reviewed used questionable analytic techniques. For example, Havas and others found that a special peer counselor program was effective in increasing nutrition knowledge and the consumption of fruits and vegetables. To reach this finding, Havas and others compared the average fruit and vegetable consumption of the special "5-a-Day" group to the average fruit and vegetable consumption of a group exposed to the standard WIC nutrition education. The comparison, which examined the linkage between demographic characteristics, such as race, and fruit and vegetable consumption, did not take into account the simultaneous influence of other characteristics, such as education level, on consumption. Without an analysis technique, such as multiple regression, that can account for the influence of several factors at once, determining the extent to which the observed differences in fruit and vegetable consumption are the result of the "5-A-Day" program is greatly complicated.

- Selection bias. Ideally, study participants should be randomly assigned to intervention and control groups to ensure that all participant characteristics will, on average, be the same from one group to another. A selection bias exists if the two groups differ in some systematic way. Selection bias makes it more difficult to attribute an observed difference in outcomes between the two groups to any one factor, such as the intervention. Six of the demonstration studies we reviewed have a possible selection bias. For example, Tuttle and Dewey examined the influence of a new, culturally sensitive breastfeeding education intervention on the initiation and duration of breastfeeding among Hmong WIC participants in Northern California.[10, 11] However, the study's research design depended on women to volunteer to participate in the study—the women self-selected themselves to participate in the special intervention. Thus, those choosing to participate in the special intervention may have shared characteristics (for example, an already existing inclination to breastfeed) that did not exist in those women who chose not to participate. If present, selection bias could lead the researcher to overstate the benefits of the special intervention.
- Low response rate/missing data. To substantially reduce data reliability concerns, experts agree that under most circumstances researchers need at least 75 percent of the people they ask to participate in a study

[10]Cynthia Reeves Tuttle and Kathryn G. Dewey, "Impact of a Breastfeeding Promotion Program for Hmong Women at Selected WIC Sites in Northern California," *Journal of Nutrition Education*, Vol. 27, No. 2 (1995), p. 69.

[11]Most Hmong living in the United States today came from Laos.

to agree. Excessive missing data, or poor response rates, may skew research findings. Missing data or poor response rate was a limitation in five of the demonstration studies. For example, Ahluwalia and others evaluated five new breastfeeding interventions, and attributed significant improvements in breastfeeding initiation to them.[12] However, the database employed by the study contained breastfeeding initiation data for only 52 percent of the women in the sample.

- Measurement error. For an analysis to produce reliable results, the measures in the analysis must be accurate. Measurement error is the difference between a measured value and its true value. Five of the studies have potential measurement errors. For example, Shaw and Kaczorowski sought to examine the effectiveness of a peer counseling program on breastfeeding initiation and duration by asking new mothers to recall interactions with breastfeeding peer counselors that took place at the time of birth.[13] Mothers were interviewed 6 weeks to 6 months after giving birth. If memory lapses occurred, new mothers may have incorrectly recalled their dealings with peer counselors, thereby potentially introducing measurement error into the data.

Appendix V shows the major findings and methodological limitations of each of the 12 demonstration studies.

Our analysis suggests that the effective interventions described in the demonstration studies may cost more than standard WIC approaches. For example, most breastfeeding special interventions were specifically designed to increase the amount of counseling and support provided to prenatal and postpartum women. Although only one of the demonstration studies provided information about the additional costs associated with such interventions, it is reasonable to expect that such one-on-one support will cost more than the standard WIC program.

Two of the demonstration studies help to illustrate the linkage between resource commitment and results achieved. The first, Ahluwalia and others, which found that a hospital-based strategy providing bedside

[12]Indu B. Ahluwalia, Irene Tessaro, Laurence M. Grummer-Strawn, and others, "Georgia's Breastfeeding Promotion Program for Low-Income Women," *Pediatrics*, Vol. 105, No. 6 (2000), p. 85.

[13]Elizabeth Shaw and Janusz Kaczorowski, "The Effect of a Peer Counseling Program on Breastfeeding Initiation and Longevity in a Low-Income Rural Population," *Journal of Human Lactation*, Vol. 15, No. 1 (1999), p. 19.

support and counseling to women who had just given birth, was the most effective at increasing breastfeeding initiation rates out of five new strategies evaluated. This strategy clearly required more resources than the standard practice of providing counseling and brochures to participants during a visit to the WIC clinic. The second study, Weimer, which was funded by USDA, focused on a special intervention that was similarly resource-intensive. It reported that providing one-on-one support in the hospital after delivery, followed by an in-home visit within 72 hours of birth, increased breastfeeding duration. However, neither study provided any information about the additional costs needed to implement these special interventions.

Only one of the 12 demonstration studies we reviewed, Hutchins and others, provided any information about the costs associated with the implementation of the special intervention.[14] This study reported that vaccinations increased at sites providing vaccination screening and voucher incentives (until their children are immunized, a family must visit the clinic monthly—rather than every 3 months—to pick up WIC vouchers). This study uses what its authors term "crude" cost-effectiveness ratios to estimate the average cost for each additional child with up-to-date immunizations. These costs range between $30 and $73, depending on the number of enrolled children and rates of active participation.

Impact Research Provides Very Limited Information on the Effectiveness of WIC's Individual Nutrition Services

The seven impact research studies we reviewed provide few conclusive insights into the recent effectiveness of WIC breastfeeding promotion and support, referral services, or nutrition education services.

[14]Sonja S. Hutchins, Jorge Rosenthal, Pamela Eason, and others, "Effectiveness and Cost-Effectiveness of Linking the Special Supplemental Program for Women, Infants, and Children (WIC) and Immunization Activities," *Journal of Public Health Policy*, Vol. 20, No. 4 (1999), p. 408.

Breastfeeding Promotion and Support

Three of the four impact studies that focused on breastfeeding promotion and support—Schwartz and others,[15] Balcazar and others,[16] and Timbo and others[17]—use old data from the 1988 National Maternal and Infant Health Survey. Although, according to FNS officials, this survey represents the most recent data available, much has changed in the program since 1988, including the characteristics of WIC participants and the emphasis the program places on breastfeeding. As a result, these studies' findings shed little light on the program's current effects. Although the fourth study,

Wiemann and others,[18] uses data from the mid-1990s, its limited scope, in terms of geography and participants, constrains the applicability of its findings. This study, with data collected from 684 adolescent mothers who gave birth at a hospital in Galveston, Texas, could have some specialized usefulness, but would have to be replicated at many other sites to provide insights into the broader effectiveness of WIC's breastfeeding promotion and support services. In addition, since adolescent mothers comprise only about 11 percent of all WIC mothers, the study's focus on them further compromises its more general usefulness.[19]

Taken as whole, the inconsistency in the findings of these four studies further limit their usefulness in assessing the effects of WIC's breastfeeding promotion and support program. For example, Wiemann and others and Balcazar and others find that WIC enrollment is a significant factor in some mothers' decision to bottle-feed, while Timbo and others, and Schwartz and

[15]J. Brad Schwartz, Barry M. Popkin, Janet Tognetti, and others, "Does WIC Participation Improve Breastfeeding Practices," *American Journal of Public Health*, Vol. 85, No. 5 (1995), p. 729.

[16]Hector Balcazar, Catherine M. Trier, and Jose A. Cobas, "What Predicts Breastfeeding Intention in Mexican-American and Non-Hispanic White Women? Evidence from a National Survey," *Birth*, Vol. 22, No. 2 (1995), p. 74.

[17]Babgaleh Timbo, Sean Altekruse, Marcia Headrick, and others, "Breastfeeding Among Black Mothers: Evidence Supporting the Need for Prenatal Intervention," *Journal of the Society of Pediatric Nurses*, Vol. 1, No. 1 (1996), p. 35.

[18]Constance M. Wiemann, Jacqueline C. DuBois, and Abbey B. Berenson, "Racial/Ethnic Differences in the Decision to Breastfeed Among Adolescent Mothers," *Pediatrics*, Vol. 101, No. 6 (1998), p. 11.

[19]Susan Barlett, Melanie Brown-Lyons, Douglas Moore, and others, *WIC Participant and Program Characteristics 1998* (Alexandria, Va.: USDA, Food and Nutrition Service, 2000), p. 38.

others, conclude that WIC participation increases breastfeeding. No consistent message emerges from the studies.

Referral Services

The two referral service impact studies have methodological constraints that, to varying degrees, limit their usefulness in assessing the effectiveness of WIC referral services. The first study, Suarez and others, using survey data from 30 counties in Texas, found that children who are enrolled in WIC are significantly more likely than children who are not enrolled to be up-to-date on their immunizations, regardless of other intervening factors such as the child's age, ethnicity, or the family's income.[20] Although this study likely contains some measurement error, it provides at least limited evidence that WIC referral services are effective in increasing immunization rates.[21] In contrast, due to major methodological problems, the second referral study, McCunniff and others,[22] provides little useful information on the effectiveness of WIC referral services. This study is based on self-administered questionnaire data collected from a sample of mothers at three WIC sites in Kansas City, Missouri. The study found that when taking into account factors such as WIC referral, child's age, household size, and availability of dental insurance, only the age of the child had a significant, independent effect on the likelihood that children will visit a dentist. There are two principal limitations to this study. First, almost 40 percent of the sampled children were younger than 1 year old. Because many children less than 1 year of age do not yet have teeth, they are much less likely to have made a dental visit, thus reducing the study's ability to identify factors associated with dental visits other than age. The second major limitation is the measurement error associated with the reliance on self-reported questionnaire data about visits to the dentist. The study did not attempt to verify questionnaire responses through a review of dental records. The authors suggested that such reviews would have increased the accuracy of the self-reported data. As a result of these serious methodological problems, it is likely that McCunniff and others has

[20]Lucina Suarez, Diane M. Simpson, and David R. Smith, "The Impact of Public Assistance Factors on the Immunization Levels of Children Younger Than 2 Years," *American Journal of Public Health*, Vol. 87, No. 5 (1997), p. 845.

[21]Measurement error is likely in Suarez and others because the immunization information provided by 28 percent of those interviewed was based on parents' recollections of their children's immunizations, rather than medical records or other documentation.

[22]Michael D. McCunniff, Peter C. Damiano, Michael J. Kanellis, and others, "The Impact of WIC Dental Screenings and Referrals on Utilization of Dental Services Among Low-Income Children," *Pediatric Dentistry*, Vol. 20, No. 3 (1998), p. 181.

only limited relevance to understanding the effectiveness of WIC referral services.

Nutrition Education

The one study that primarily focused on the impact of nutrition education, Fox and others, also examined breastfeeding programs and their effectiveness.[23] However, Fox and others was limited geographically, and had other limitations that reduce its usefulness in assessing the effectiveness of WIC's nutrition education. For example, its scope was limited in that it focused on pregnant and postpartum women at six WIC sites, in three states. Within this limited context, the study describes program and participant characteristics; the nutrition services offered (including breastfeeding promotion and support); participants' receipt of and satisfaction with these services; and changes in participants' knowledge and behaviors between the time of prenatal WIC certification and 4 to 6 months postpartum. The study also attempted to assess the impact of WIC nutrition education on participants' knowledge and behavior. Although the study concluded that participants' nutrition knowledge and behavior improved significantly over the course of the study, attributing these changes to WIC is problematic because the study did not use a control group. Instead, Fox and others compared intervention groups at different points in time. The study also concluded that (1) WIC participation did not significantly increase breastfeeding initiation or duration; and (2) women's decisions regarding infant feeding are strongly associated with intentions formed during pregnancy.

Conclusion

Demonstration studies, despite some methodological limitations, provide program managers and policymakers with some useful information about the types of WIC nutrition service interventions that can have positive impacts on participants. However, only one recent demonstration study provides any information on the costs associated with implementing various interventions. Given the limited resources available to provide WIC nutrition services, information about the costs to provide effective services could play a critical role in managers' decisions to implement the intervention and policymakers' decisions about funding the intervention.

[23]Mary Kay Fox, Nancy Burstein, Jenny Golay, and others, *WIC Nutrition Education Assessment Study: Final Report* (Alexandria, Va.: U.S. Department of Agriculture, Food and Nutrition Service, 1999), p. vii.

Recommendation

In order to maximize the value of nutrition education, breastfeeding promotion and support, and referral service demonstration and evaluation research funded by USDA, we recommend that the Secretary of Agriculture direct officials responsible for implementing such research to require that this research include an assessment of the costs associated with the special intervention being evaluated.

Agency Comments and Our Response

We provided a draft of this report to the Department of Agriculture's Food and Nutrition Service for review and comment. We met with Food and Nutrition Service officials, including the Acting Associate Deputy Administrator for Special Nutrition Programs. The agency officials generally agreed with the report's findings and recommendation. However, the officials questioned why our recommendation did not address actions that WIC researchers should take to deal with some of the methodological limitations we identified in research evaluating the effectiveness of WIC services. We believe that USDA has a responsibility to ensure that the WIC and other nutrition program research it funds are of high quality. However, our review was not designed to examine USDA's policies and procedures to ensure the quality of the research it funds or the practices it employs to promote high-quality research in studies it does not fund. As a result, we are not making any specific recommendations concerning how USDA might improve the quality of WIC research at this time.

The officials also provided some technical changes and clarifications to the report, which we incorporated as appropriate.

We are sending copies of this report to the appropriate congressional committees; interested Members of the Congress; the Honorable Ann M. Veneman, Secretary of Agriculture; the Honorable Mitchell E. Daniels, Jr., Director of the Office of Management and Budget; and other interested parties. We will also make copies available upon request.

If you or your staff have any questions about this report, please contact me or Thomas E. Slomba at (202) 512-7215. Key contributors to this report are listed in appendix VI.

Robert E. Robertson

Director, Employment, Workforce, and
Income Security Issues

Scope and Methodology

To identify recent studies that examine the effectiveness of the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) nutrition education, breastfeeding promotion and support, and referral services, we searched relevant databases, such as National Technical Information Service, Sociological Abstracts, and Wilson Social Science Abstracts. We also consulted with the U.S. Department of Agriculture (USDA) WIC program staff and other program stakeholders, including officials from the National Association of WIC Directors. Through this process, we identified 209 items published from 1988 through 2000 dealing with various aspects of the WIC program. To be used in our review, individual items had to meet each of the following criteria:

- publication in a refereed medium (for example, a journal article, book or book chapter, USDA-issued report);
- publication date of 1995 or later;
- examination of one or more of WIC's nutrition services (breastfeeding promotion and support, nutrition education, or health referrals); and
- original analysis of a specific nutrition service's effectiveness.

Altogether, only 19 items met all four criteria. Many—86 of the 190 items we rejected—were published prior to 1995, and therefore do not satisfy our definition of recent studies. (We established 1995 as the cutoff to enable us to better examine the program as it currently operates.) We eliminated the remaining 104 items because they did not meet one or more of our criteria. For example, some items appeared in our literature search as professional papers delivered at conferences; thus, they did not undergo any formal referee process. Other items were published as reviews or summaries of original research, but did not include any original research of their own. Some items do not focus on the effectiveness of specific WIC nutrition services. For example, one study examines the general effects of food programs—including WIC and other food assistance programs such as food stamps—on diet, but does not evaluate the effectiveness of specific WIC nutrition service programs.

Once we narrowed the scope of our study, we met with staff in the USDA's Food and Nutrition Service Office of Analysis, Nutrition and Evaluation to ensure that our methodology did not exclude any important studies. According to these officials, our approach successfully identified all of the major recent evaluation studies on WIC nutrition services.

We then conducted detailed reviews of the 19 studies. These reviews entailed an evaluation of each study's research methodology, including its

data quality, research design, and analytic techniques, as well as a summary of its major findings and conclusions. We also assessed the extent to which each study's data and methods support its findings and conclusions.

Research Funding Sources

Study	Funding source(s)
Demonstration studies	
Ahluwalia and others, 2000	Centers for Disease Control and Prevention
Hutchins and others, 1999	Centers for Disease Control and Prevention
Shaw and Kaczorowski, 1999	Unspecified
Abusabha and others, 1998	New Mexico Department of Health
Gross and others, 1998	U.S. Department of Health and Human Services
Havas and others, 1998	National Cancer Institute; Maryland Department of Health and Mental Hygiene
Hoekstra and others, 1998	Centers for Disease Control and Prevention
Weimer, 1998	USDA/ERS
Grummer-Strawn and others, 1997	Centers for Disease Control and Prevention
Reifsnider and Eckhart, 1997	Beta Delta Chapter at Large; Sigma Theta Tau
Birkhead and others, 1995	Centers for Disease Control and Prevention
Tuttle and Dewey, 1995	California State Department of Health
Impact studies	
Fox and others, 1999	USDA/FNS
McCunniff and others, 1998	Unspecified
Wiemann and others, 1998	National Institute on Drug Abuse; Hogg Foundation for Mental Health
Suarez and others, 1997	Texas Department of Health; Public Policy Research Institute, Texas A&M University
Timbo and others, 1996	Unspecified
Balcazar and others, 1995	Unspecified
Schwartz and others, 1995	USDA/FNS; Research Triangle Institute, University of North Carolina

Bibliography of Demonstration Studies

Breastfeeding Promotion and Support

Ahluwalia, Indu B., Irene Tessaro, Laurence M. Grummer-Strawn, and others. "Georgia's Breastfeeding Promotion Program for Low-Income Women." *Pediatrics*, Vol. 105, No. 6 (2000), pp. 85–91.

Shaw, Elizabeth, and Janusz Kaczorowski. "The Effect of a Peer Counseling Program on Breastfeeding Initiation and Longevity in a Low-Income Rural Population." *Journal of Human Lactation*, Vol. 15, No. 1 (1999), pp. 19–25.

Gross, Susan M., Laura E. Caulfield, Margaret E. Bentley, and others. "Counseling and Motivational Videotapes Increase Duration of Breast-Feeding in African-American WIC Participants Who Initiate Breast-Feeding." *Journal of the American Dietetic Association*, Vol. 98, No. 2 (1998), pp. 143–148.

Weimer, Jon P. *Breastfeeding Promotion Research: The ES/WIC Nutrition Education Initiative and Economic Considerations.* Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, 1998.

Grummer-Strawn, Laurence M., Susan P. Rice, Kathy Dugas, and others. "An Evaluation of Breastfeeding Promotion Through Peer Counseling in Mississippi WIC Clinics." *Maternal and Child Health Journal*, Vol. 1, No. 1 (1997), pp. 35–42.

Reifsnider, Elizabeth, and Donna Eckhart. "Prenatal Breastfeeding Education: Its Effect on Breastfeeding Among WIC Participants." *Journal of Human Lactation*, Vol. 13, No. 2 (1997), pp. 121–125.

Tuttle, Cynthia Reeves, and Kathryn G. Dewey. "Impact of a Breastfeeding Promotion Program for Hmong Women at Selected WIC Sites in Northern California." *Journal of Nutrition Education*, Vol. 27, No. 2 (1995), pp. 69–74.

Nutrition Education

Abusabha, Rayane, Cheryl Achterberg, and Jeannie McKenzie. "Evaluation of Nutrition Education in WIC." *Journal of Family and Consumer Sciences*, Winter (1998), pp. 98–104.

Havas, Stephen, Jean Anliker, Dorothy Damron, and others. "Final Results of the Maryland WIC 5-A-Day Promotion Program." *American Journal of Public Health*, Vol. 88, No. 8 (1998), pp. 1161–1167.

Referrals

Hutchins, Sonja S., Jorge Rosenthal, Pamela Eason, and others. "Effectiveness and Cost-Effectiveness of Linking the Special Supplemental Program for Women, Infants, and Children (WIC) and Immunization Activities." *Journal of Public Health Policy*, Vol. 20, No. 4 (1999), pp. 408–426.

Hoekstra, Edward J., Charles W. LeBaron, Yannis Megaloeconomou, and others. "Impact of a Large-Scale Immunization Initiative in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)." *Journal of the American Medical Association*, Vol. 280, No. 13 (1998), pp. 1143–1147.

Birkhead, Guthrie S., Charles W. LeBaron, Patricia Parsons, and others. "The Immunization of Children Enrolled in the Special Supplemental Food Program for Women, Infants, and Children (WIC)." *Journal of the American Medical Association*, Vol. 274, No. 4 (1995), pp. 312–316.

Bibliography of Impact Studies

Breastfeeding Promotion and Support

Fox, Mary Kay, Nancy Burstein, Jenny Golay, and others. *WIC Nutrition Education Assessment Study: Final Report.* Alexandria, Va.: U.S. Department of Agriculture, Food and Nutrition Service, 1999.

Wiemann, Constance M., Jacqueline C. DuBois, and Abbey B. Berenson. "Racial/Ethnic Differences in the Decision to Breastfeed Among Adolescent Mothers." *Pediatrics*, Vol. 101, No. 6 (1998), pp. 11–23.

Timbo, Babgaleh, Sean Altekruse, Marcia Headrick, and others. "Breastfeeding Among Black Mothers: Evidence Supporting the Need for Prenatal Intervention." *Journal of the Society of Pediatric Nurses*, Vol. 1, No. 1 (1996), pp. 35–46.

Balcazar, Hector, Catherine M. Trier, and Jose A. Cobas. "What Predicts Breastfeeding Intention in Mexican-American and Non-Hispanic White Women? Evidence From a National Survey." *Birth*, Vol. 22, No. 2 (1995), pp. 74–80.

Schwartz, J. Brad, Barry M. Popkin, Janet Tognetti, and others. "Does WIC Participation Improve Breast-Feeding Practices?" *American Journal of Public Health*, Vol. 85, No. 5 (1995), pp. 729–731.

Referrals

Fox, Mary Kay, Nancy Burstein, Jenny Golay, and others. *WIC Nutrition Education Assessment Study: Final Report.* Alexandria, Va.: U.S. Department of Agriculture, Food and Nutrition Service, 1999.

McCunniff, Michael D., Peter C. Damiano, Michael J. Kanellis, and others. "The Impact of WIC Dental Screenings and Referrals on Utilization of Dental Services Among Low-Income Children." *Pediatric Dentistry*, Vol. 20, No. 3 (1998), pp. 181–187.

Suarez, Lucina, Diane M. Simpson, and David R. Smith. "The Impact of Public Assistance Factors on the Immunization Levels of Children Younger Than 2 Years." *American Journal of Public Health*, Vol. 87, No. 5 (1997), pp. 845–848.

Demonstration Studies: Major Findings, Scope, and Major Limitations

Study	Major finding(s)	Scope (timeframe)	Major limitation(s)
Nutrition education			
Abusabha and others, 1998	Nutrition education lectures and facilitated group discussions were more effective than brochures at increasing participants' nutrition knowledge. Facilitated group discussion was more effective than brochures at increasing participants' confidence in performing specific nutrition related behaviors.	Seven WIC clinics in New Mexico (not specified)	Missing data; selection bias
Havas and others, 1998	Consumption of fruits and vegetables increased after an education program consisting of a series of three 45-minute group sessions taught by paid peer educators and incorporating special visual materials and a direct mailing to participants.	Sixteen WIC clinics in Maryland (not specified)	Missing data; measurement error; inappropriate data analysis techniques
Breastfeeding			
Gross and others, 1998	The duration of breastfeeding among African-American WIC participants increased with peer counselor support or viewing promotional breastfeeding videos.	Four WIC sites in Baltimore, Md. (1992–1994)	Selection bias; measurement error
Ahluwalia and others, 2000	WIC participants increased the initiation of breastfeeding when exposed to (1) an enhanced education program with access to a hotline, (2) a free breast-pump loan program, (3) a hospital-based program with bedside support and counseling after delivery, (4) community coalitions, and (5) peer counseling provided by former participants.	State of Georgia (1992–1996)	Missing data
Weimer, 1998	1. Breastfeeding initiation and duration rates increased after volunteer peer counseling. 2. Breastfeeding initiation and duration rates increased after paid peer counseling. 3. Duration of breastfeeding increased after postdelivery contact with mother in hospital was followed up with support (including home visits) by a specially trained paraprofessional. 4. Breastfeeding initiation and duration rates increased with culturally appropriate breastfeeding education provided in high school or WIC clinics.	1. Two communities in Iowa (not specified) 2. Six counties in Michigan (not specified) 3. Five counties in North Carolina (not specified) 4. Local agency in Guam (not specified)	1. Missing data; selection bias 2. Lack of control group; missing data 3. Lack of control group 4. Selection bias
Reifsnider and Eckhart, 1997	Duration of breastfeeding increased after prenatal nutrition education classes focusing on breastfeeding.	WIC clinics in three rural Oklahoma counties (1986)	Lack of control group
Tuttle and Dewey, 1995	Breastfeeding initiation rates increased among Hmong WIC participants after a culturally sensitive prenatal breastfeeding class and prenatal and postpartum counseling.	Seven WIC clinics in three California counties (1991–1992)	Selection bias; measurement error

(Continued From Previous Page)

Study	Major finding(s)	Scope (timeframe)	Major limitation(s)
Shaw and Kaczorowski, 1999	Breastfeeding initiation and duration increased after counseling and support provided by WIC participants, trained and paid as peer counselors.	WIC programs in nine West Tennessee health departments (1996–1997)	Measurement error
Grummer-Strawn and others, 1997	Clinics with paid peer counselors had higher rates of breastfeeding initiation than clinics without peer counselors. Clinics with a lactation specialist or consultant, and peer counselors, had higher rates of breastfeeding initiation than clinics with only peer counselors. However, the benefits of lactation specialists were offset when peer counselors spent at least 45 minutes with individual participants.	Fifty-one WIC clinics in Mississippi (1989–1993)	Selection bias; missing data
Referrals			
Birkhead and others, 1998	Children were 5.5 times more likely to be immunized, and immunized more rapidly, at WIC sites where staff escorted children to a pediatric clinic in the same facility for immunization. Children were almost 3 times more likely to be immunized, and immunized more rapidly, at sites with a voucher/check incentive. (Until immunization, a family must visit the clinic monthly, rather than every other month, to pick up WIC voucher/checks.)	Six WIC sites in New York City (1991)	Lack of control group
Hoekstra and others, 1998	Immunization rates increased at sites with a voucher/check incentive (until children are immunized, a family must visit the clinic monthly, rather than every 3 months, to pick up WIC voucher/checks).	Nineteen WIC sites in Chicago (1996–1997)	Lack of control group; measurement error; inappropriate data analysis techniques
Hutchins and others, 1999	Vaccinations increased at sites with vaccination screening and a voucher/check incentive (until immunization, a family must visit the clinic monthly, rather than every 3 months, to pick up WIC voucher/checks).	Seven WIC sites in Chicago (1991–1993)	Inappropriate data analysis techniques; selection bias

GAO Contacts and Staff Acknowledgments

GAO Contacts

Robert E. Robertson, (202) 512-7215
Thomas E. Slomba, (202) 512-9910

Staff Acknowledgments

In addition to those named above, Judy Hoovler, Sara Ann Moessbauer, Corrina Nicolaou, Judy Pagano, Debra Roush, and Eugene Wisnoski made key contributions to this report.

Ordering Information

The first copy of each GAO report is free. Additional copies of reports are $2 each. A check or money order should be made out to the Superintendent of Documents. VISA and MasterCard credit cards are accepted, also.

Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

Orders by mail:
U.S. General Accounting Office
P.O. Box 37050
Washington, DC 20013

Orders by visiting:
Room 1100
700 4th St. NW (corner of 4th and G Sts. NW)
U.S. General Accounting Office
Washington, DC

Orders by phone:
(202) 512-6000
fax: (202) 512-6061
TDD (202) 512-2537

Each day, GAO issues a list of newly available reports and testimony. To receive facsimile copies of the daily list or any list from the past 30 days, please call (202) 512-6000 using a touchtone phone. A recorded menu will provide information on how to obtain these lists.

Orders by Internet:
For information on how to access GAO reports on the Internet, send an e-mail message with "info" in the body to:

info@www.gao.gov

or visit GAO's World Wide Web home page at:

http://www.gao.gov

To Report Fraud, Waste, or Abuse in Federal Programs

Contact one:

- **Web site: http://www.gao.gov/fraudnet/fraudnet.htm**
- **e-mail: fraudnet@gao.gov**
- **1-800-424-5454 (automated answering system)**

PRINTED ON RECYCLED PAPER

United States
General Accounting Office
Washington, D.C. 20548-0001

Bulk Rate
Postage & Fees Paid
GAO
Permit No. G100

Official Business
Penalty for Private Use $300

Address Correction Requested

BEST COPY AVAILABLE